# The Yellowknife Recycling Project

May, 1990

Northwest Territories Renewable Resources
Pollution Control Division

# ECOLOGY NORTH

May 27, 1990

Mr. Neill Thompson
Senior Environmental Protection Inspector
Government of the Northwest Territories
Yellowknife. NWT
X1A 2L9

Dear Sir:

**RE: Ecology North recycling demonstration project**

We are pleased to submit the final report on the Yellowknife recycling demonstration project.

The report includes information on the project as it was originally proposed to Renewable Resources, and details on how and why the project has evolved and expanded since then. It describes the methods of collection, preparation and storage of materials used by Ecology North; reasons for rejecting certain materials; loading and shipping; sales and markets; expenses and revenues; manpower requirements and volunteer participation; public support; average household production of materials; and recommendations.

We appreciate having the support of the Department of Renewable Resources for this project and look forward to working with you again.

Yours truly,

John McCullum
Director, Ecology North

BOX 2888, YELLOWKNIFE, N.W.T. X1A 2R2

Unbleached, recycled paper

# The Yellowknife Recycling Project

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# 1.0 BACKGROUND INFORMATION

## 1.1 Recycling in the NWT

Recycling is new to the Northwest Territories. Until 1989 there were no recycling programs in any NWT communities[1]. There are two main reasons recycling programs have been slow to start in the North:

- there is plenty of space in which to put garbage, so there isn't much pressure to reduce the quantities of garbage that must be landfilled; and
- the long distance to markets for recyclable materials.

Transportation of waste materials is exceedingly expensive. Materials have to be shipped hundreds or even thousands of miles to the companies which do the actual recycling.

Another consideration is the risky nature of selling waste materials. The value of glass, newspapers, tin and other recyclables is low, and prices are extremely elastic, rising and falling steeply with changing supply and demand. An example of this kind of fluctuation is that Ecology North's buyer offered $1600 a ton for aluminum cans in the summer of 1989, but just $400 a ton six months later. In 1989 a factory in Red Deer, Alberta began recycling plastic grocery bags, but went out of business after just a few months. These kinds of changes make it difficult to predict the viability of recycling programs or to estimate expenses and revenues.

## 1.2 Benefits of recycling

Recycling reduces waste. Using recycled materials to make new products uses less energy than manufacturing items out of raw materials and, locally, recycling can reduce the amount of waste that has to be burnt or landfilled. Recycling is a component of modern waste management programs which include the "4 R's": reducing the amount of garbage produced; reusing and repairing items instead of throwing them away; recycling materials where possible; and recovering energy and resources from waste materials. Recycling is important in this system because it raises people's awareness of the amount of garbage they produce and encourages them to buy less.

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[1]Some individuals collect beer bottles or aluminum cans, but this sort of ad hoc collection does not constitute a recycling program.

### 1.3 Waste Management in Yellowknife

The City of Yellowknife is at a crossroads in terms of waste management. There has been a lot of concern expressed by City residents over air pollution resulting from burning garbage at the dump. In response to these concerns, the City is taking steps to reduce the burning of garbage, and is considering ways to compact and bury the garbage more securely so it takes less space and reduces the risk of fire (a sanitary landfill). The City is also committed to beginning a City-wide recycling program within five years.

## 2.0 PROJECT HISTORY

Ecology North is an NWT-based, non-profit association of volunteers who promote appreciation for the environment. Members became interested in starting a small-scale demonstration recycling project in Yellowknife since it did not look as though the City of Yellowknife or any private businesses would begin a comprehensive[1] recycling program for several more years at least. In the spring of 1989 several Ecology North members did some preliminary research and held a public meeting to find out how much support there was for recycling in Yellowknife.

## 3.0 DETERMINING FEASIBILITY OF RECYCLING

Whether or not a recycling program will succeed depends on how it is operated, what kinds of materials are collected, and the level of community and private sector support. This section describes generally how recycling programs work, how materials are collected, prepared and stored, and where they are sent. It also describes the program Ecology North initiated.

### 3.1 How Recycling Programs Work

There are three main operations involved in running any recycling program:

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[1]Comprehensive means a recycling program which recycles as many materials as possible, not just a single high-value material such as aluminum cans.

- collection of materials;
- storage, sorting and preparation of materials; and
- shipping materials to buyers.

Within each of these steps a number of options are possible. The most appropriate options depend on the circumstances in the community, what kinds of materials are collected, and whether the project is to be run as a business or on a non-profit basis.

Collection, preparation and shipping of recyclable materials is generally not done as a profit-making venture, but is paid for by municipalities as part of their waste management programs, and may be less or more expensive depending on the system they use, what their costs are, the types of materials they collect and the prices they are able to get for the materials.

Where municipalities have not undertaken recycling, non-profit groups or small businesses may do some recycling on a small scale. The provision of a system of deposits on bottles and cans greatly facilitates the development of these smaller recycling programs. Deposits encourage people to return their bottles and cans, and create a pool of funds which can be used to cover shipping costs and other costs associated with recycling. Having a system of deposits means recycling programs require less direct government support in the form of subsidies.

Final processing of most materials occurs in large, centralized, industrial plants, normally operated by private industry.

### 3.1.1 Collecting Materials

Options for collection of materials may include:

- having a special cleanup day once a year or from time to time (ie. the first Saturday every month) where people bring their materials to a designated place;
- picking up materials from people's homes, offices or businesses on an ongoing basis;
- setting up a place where community residents can drop off the materials at their convenience (ie. a warehouse, garage, drop-off boxes, an empty truck or outdoor fenced area); or
- finding volunteers to be responsible for collecting materials, or paying workers to collect materials.

### 3.1.2 Sorting, Preparing and Storing Materials

Options for sorting, preparation, and storage depend on the types of materials collected and could include the following:

- squashing aluminum cans by hand (or foot), and packing them in large plastic bags or boxes for return for the deposit;
- sorting returnable beer bottles into cases for return to the brewery for deposit;
- individually squashed tin cans may be packed in large boxes strapped onto pallets and sold to a scrap metal dealer;
- both tin and aluminum cans may be squashed with a machine designed for the purpose (these range from small presses which do one can at-a-time to large expensive hydraulic machines which crush thousands of cans into cubes of metal in a few minutes);
- glass may be sorted and (carefully) broken by hand or with a machine designed for the purpose;
- broken glass may be stored and shipped in large heavy reinforced boxes on pallets, or in clean empty 40-gallon drums placed on pallets and strapped together with metal banding;
- the storage facility may consist of an outdoor fenced area, an empty truck trailer, a storeroom, warehouse or garage.

### 3.1.3 Shipping Materials

Options for shipping materials may include:

- finding volunteers to drive small amounts of materials out to depots or dealers on an ad hoc basis;
- paying regular back-haul rates to a transport company;
- soliciting a donation of shipping costs from the private sector to cover back-haul rates; or
- soliciting free backhaul from the transport company which may be a trucking firm, an airline or the sealift.

## 3.2 What Happens to Recyclables

While there is a lot of enthusiasm amongst Canadian consumers for recycling, there are not enough businesses set up to create a demand for the collected materials. This creates a problem for northerners interested in recycling, as materials have to be transported a long way to markets.

### 3.2.1 Plastics

Plastics are one example of this problem. They are recycled on a small scale in several parts of Canada, often on an experimental basis. Existing plants are already oversupplied with waste plastic and are not interested in receiving more at this time. Plastics must be separated according to type, ie. plastic grocery bags cannot be mixed in with plastic pop bottles. Each type of plastic is manufactured differently and has to go to a different plant for reprocessing.

### 3.2.2 Paper Products

Newspapers are another example where the supply exceeds the demand. There are only three mills in Canada which recycle newspapers. Two are located in Ontario, and are already supplied with more waste newspapers than they can use from recycling programs in Ontario. A third mill has recently opened in western Canada. Western recyclers have been shipping waste newspaper overseas to Japan, because the supply of waste newspaper far exceeds the demand. Newspaper is now worth about $10 a tonne.

With cardboard and fine quality office bond paper the picture is slightly better. Cardboard and bond paper can be sold to Canadian waste paper dealers who process the paper in some way (ie. grade, shred or bale it) and deliver it to the paper mill (generally in the United States). Fine papers may be worth as much as $130 per tonne in Edmonton if it high-grade and sorted. Most high-grade waste paper is used in the manufacturing of boxboard and tissue. Some is used in linerboard, fine papers, writing papers, and newsprint. Mixed paper has a low market value as well as very limited markets.

### 3.2.3 Glass Bottles

There are glass factories which recycle glass in Regina and Vancouver. The glass must be separated by colour (clear, green and brown). Glass is crushed and mixed with sand, limestone and other materials normally used to make new glass, and melted in a furnace. Glass collected in recycling programs may be sent directly to these plants and if properly prepared brings about $75 per tonne. Ground glass has also been used to replace part of the sand used in concrete and asphalt, though this has not been tried in the Northwest Territories.

### 3.2.4 Aluminum and Tin Cans

Aluminum cans may be returned in small numbers to depots or dealers in order to collect the deposit. Large quantities of aluminum must be sold by weight to dealers who in turn sell it a plant in Kentucky where the cans are shredded, delacquered and melted down before being rolled into sheet aluminum. Aluminum sold by weight must be clean, crushed and baled. In the last year prices paid for aluminum have varied from $1600 per tonne to $400.

There are markets for tin cans in Alberta and Saskatchewan. Tin cans are currently valued at about $35 per tonne in Edmonton. Plants use a chemical process to remove the tin from the steel, allowing both metals to be recycled. The high grade scrap steel is used to make top-grade steel such as stainless steel. Tin is used for tin-plating aluminum parts for automobiles and electrical equipment.

## 3.3 Selection of a Program for Ecology North

### 3.3.1 Setting Objectives

Ninety Yellowknife residents attended a public meeting organized by Ecology North to determine objectives for the recycling project. The model Ecology North decided to adopt is based on the experiences of non-profit small-scale recyclers down south. This sort of small-scale non-profit project generally includes:

- reliance on volunteers to do most or all of the labour, promotion and co-ordination;
- support by the private sector in the form of donations of money, or donations in-kind (ie. loaned machinery, free shipping);
- support by government in the form of subsidies, or supporting infrastructure or legislation (ie. deposit legislation); and
- starting with one or a few materials.

People at the meeting agreed the project should be run by volunteers, not as a "fund-raiser" for Ecology North but on a non-profit basis. The group decided to keep the project small-scale as they did not want to get into borrowing money to finance a larger operation. Another advantage of starting out small was that the program could be simple to introduce and administer, inexpensive and flexible, and could be

started (or stopped) almost immediately.

One of the prime objectives identified at the meeting was to reduce the amount of waste materials going into the City garbage dump. To this end it was decided that all materials for which markets could be found would be considered for collection. A strategy was developed for breaking even on shipping whereby enough aluminum would be put on the truck to pay for the truck-load, and then as much of the other lower-value materials as possible would be loaded on the truck as well. If we ended up with a surplus of a certain low-value material, we would try to raise enough funds to pay to ship it out.

Other important objectives identified included raising public awareness, involving the private sector and demonstrating the feasibility of recycling in Yellowknife.

To help raise public awareness, participants felt the recycling should be supported by a public education campaign, consisting of newspaper columns, radio stories and announcements, and advertising and flyers describing what northern residents could do to reduce the amount of garbage they generate.

The private sector was to be involved in order to provide local businesses with opportunities to gain experience in recycling. By demonstrating the feasibility of recycling, the group also hoped to smooth the way for the City of Yellowknife to begin recycling in future on a larger scale.

In order to gain experience in different types of programs, and to maximize the amount of materials collected, it was decided that collections would take three forms:

- a drop-off depot;
- a curb-side pickup from fifty volunteer households; and
- pickups of aluminum cans from target groups such as restaurants and special events like caribou carnival.

The purpose of the blue box curbside pickup was to determine on average how much glass and cans fifty families in Yellowknife produce[1]. This information is useful in

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[1]Though statistics of this sort are available from other communities such as Edmonton, we did not want to assume people in Yellowknife throw away the same amounts and proportions as people in Edmonton. There is no accurate way to determine how many people use the depot.

predicting how many materials would be collected if the whole community was participating, thus helping to predict the viability of a larger recycling program. The purpose of the targeted pickups of aluminum cans was to ensure we collected enough aluminum to subsidize shipping and other costs for the less valuable materials like glass and tin.

### 3.3.2 Getting Started

Virtually everyone at the meeting signed on as a volunteer[1]. A core group of 12 people formed a recycling committee. Following the meeting, people on the committee began searching for support from the business community and from government. Local businesses who were considered to have an interest (transport companies, building supply companies, service companies, etc.) were called systematically and asked to provide support in the form of donations of recyclable materials, cash, services, building materials, or rental equipment.

Local Members of the Legislative Assembly and City of Yellowknife representatives were contacted to find out if they could provide storage space or other services.

Buyers were located for plastic grocery bags, tin cans, aluminum cans, glass bottles, waste office papers and cardboard (markets could not be found for other types of plastic or for newspapers).

Appendix A in this report contains a sampling of newspaper articles on recycling and recycling problems. Appendix B is a list of contacts and buyers of materials. The Edmonton Recycling Society, and Pacific Metals in Vancouver were found to be especially helpful. Appendix C contains a flyer explaining how each material must be prepared in order to be acceptable to the buyers.

### 3.3.3 Government Support

The Government of the Northwest Territories has an interest in recycling, and felt the information gathered by Ecology North could assist other groups in northern communities interested in recycling.

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[1]Another eighty-five people answered a newspaper ad indicating they were interested in volunteering as well.

Ecology North received funding from the Department of Renewable Resources, Government of the Northwest Territories to help support the pilot project. The funding consisted of a start-up grant of $10,500. Approximately half of the start-up funds were for equipment, shipping and materials. The other half of the start-up funds paid for a part-time co-ordinator for the first four months of the project. The co-ordinator's job was to:

- oversee the operation of the project;
- publicize the project (press releases, flyers, etc.);
- maintain contact with the Territorial Government, the City of Yellowknife and the Co-op;
- organize and supervise volunteer activities such as the curb-side pickup and processing materials;
- keep records of transactions, volunteers hours, amount of materials collected, etc.; and
- write a report detailing the methods of collection, preparation and storage of materials; reasons for rejecting materials; loading and shipping; sales and markets; expenses and revenues; manpower requirements and volunteer participation; public support; average household production of materials; and recommendations.

Ecology North also entered into discussions with the Department of Government Services regarding the group's future participation in recycling waste paper from government offices.

## 4.0 START-UP OF ECOLOGY NORTH'S RECYCLING PROJECT

### 4.1 Collection, Preparation and Storage of Materials

The Yellowknife Direct Charge Co-op (a store at the south end of Yellowknife) agreed to allow Ecology North to put a depot at the back of the its parking lot at no charge. This outdoor depot was constructed by volunteers. It consists of a thirty by thirty foot fenced area built with donated materials[5]. Collection bins with slots for depositing the various materials were constructed out of window crates collected at the garbage dump. Materials are stored in large cardboard

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[5]Ecology North is registered with Revenue Canada as a non-profit charitable association and can provide tax receipts for donations.

bins on pallets inside the fenced area. We obtained a site development permit in order to erect the fence on the Co-op property. No other permits were necessary. An insurance policy was taken out in case someone was injured at the depot site. The fact that the only storage area we had was outdoors meant we could not collect fine paper or cardboard even though we had markets for them.

Participants in the blue box curbside pickup were selected from amongst those attending the public meeting and from responses to a newspaper ad, on the basis of their willingness to assist with the pick-up from time to time. Participants purchased blue plastic "we recycle" bins from Ecology North for $10. A route list was drawn up with the City divided into four neighbourhoods, each with twelve or thirteen households. Curbside participants agreed to pick up the materials from their own neighbourhood and deliver them to the depot, a process which takes less than an hour. Co-ordination of volunteers for all the neighbourhoods is done by a member of the recycling committee.

We were not successful in securing targeted pick-ups of materials in the first four months of the project. Bars and restaurants were contacted, but initially were not interested in participating; however this changed through the year and is described under section 5: "Expansion of the Project".

Flyers explaining how the materials had to be prepared were written. Copies were given to curbside participants and Co-op members (Appendix C).

The Edmonton Recycling Society, also a non-profit group, agreed to purchase all our materials at competitive rates, minus an administrative fee. Finding one broker to handle all our materials was an enormous advantage for us because the buyers are located in different places. If we did not have the Edmonton Recycling Society purchasing all our materials, we would have to ship some to Edmonton (aluminum), some to Calgary (tin cans) and some to Vancouver (glass), with correspondingly higher costs for shipping and unloading. The Edmonton Recycling Society does not appear to be interested in continuing to accept Ecology North's materials over the long term, but are willing to help temporarily until we are well-established and more experienced.

The project was kicked off during Environment Week, the first full week in June.

### 4.2 Day-to-day Operations

### 4.2.1 Blue Box Curbside Pickup

Blue box participants are phoned to do their share of the pick-ups for their neighbourhood. Most people help an average of once every two months. The curbside pick-up provides very good control over the quality of materials because anything not prepared properly (ie. wine bottles with metal rings left on, uncrushed cans) can simply be left in the bin and not collected.

### 4.2.2 The Depot

Several hundred families regularly use the Co-op depot. Sorting and preparation of the collected materials is done by volunteers. The depot provides the bulk of collected materials. However, materials left at the depot tend to be less well-prepared than materials picked up at the curb. The drop-off bins hold about two weeks worth of materials. As the bins fill up the materials are checked, prepared and transferred to the shipping bins.

### 4.2.3 Preparation and Rejection of Materials

Preparation of materials is extremely important. Materials must be sorted and clean to be accepted by the buyer. If materials are not properly prepared, you run the risk of gaining a poor reputation amongst buyers of materials, and may have trouble getting the going price for your materials whether they are properly prepared or not.

Despite the flyers and the signs at the depot, about a third of the aluminum cans deposited at the depot are not crushed. Depot users appear to be aware the cans should be crushed, because when volunteers are working at the depot people bringing uncrushed cans crush them on-site (a good reason for having a staffed depot). Initially the uncrushed aluminum cans we received were flattened by spreading them out on the gravel parking lot and running over them with a pickup truck. We were advised to do this by one of the aluminum buyers, but we later learned the manufacturers strongly prefer <u>clean</u> crushed cans.

Glass bottles are picked through by hand. At times as many as half the wine bottles deposited at the depot have plastic, foil, wax, raffia, styrofoam or metal left on, despite signs advising people that these materials have to be removed. Volunteers have to remove these materials by hand. Paper

labels may stay on. Glass must be sorted by colour, as the glass recycler in British Columbia does not accept mixed colours. Clear glass must contain less than 1% other colours of glass or impurities such as paint or oil. A bin of green glass may contain a small amount of clear glass. Brown glass in turn may include a small amount of clear or green glass. Blue glass is included with green or brown glass. Frosted glass (not clear) or glass with metal imbedded in it is not acceptable. Most clear bottles and brown bottles only come with paper labels and are not so much trouble to sort and clean. People sorting and checking the glass bottles must also remove any other kinds of glass which may be mixed in. No window glass or glass dishes can be included. The glass is crushed by putting a layer of bottles in the shipping container, and smashing them with an iron plate welded to a pole. Volunteers wear sturdy boots, leather gloves, a hat and face protection when doing this. The glass is broken for reasons of economy. We pay for shipping by volume, not weight. The more bottles we can fit in a crate the more economical it is to ship them. The watermelon crates are placed on top of a pallet, so a forklift can move the box easily.

Approximately a quarter of the tin cans deposited at the depot do not have the paper labels removed. Volunteers pick the labels off by hand. Fortunately the paper labels on tin cans are easy to remove. People occasionally mix in other kinds of metal with the tin and aluminum cans, such as aluminum foil or metal lids from glass jars. These metals cannot be included. Foil and lids often contain more than one kind of metal, and may contaminate (ruin) the manufacturer's whole batch of metal. When crushing the cans, volunteers watch for these extraneous materials and remove them by hand.

For the pilot project, crushed cans and glass were placed in large cardboard containers known as "watermelon crates". The crates are made of 1/2 inch waxed corrugated cardboard, measure a metre or more cubed, and are quite durable. We purchased the containers from a produce supplier in Edmonton for $7 each.

Occasionally materials are left at the depot which we cannot make use of (newspapers, plastic pop bottles, foil, paper bags, broken window glass). This is a problem also experienced by recycling depots in other parts of Canada. Volunteers take these unwanted materials to the garbage dump.

### 4.3 Loading and Shipping Materials

As Ecology North has not yet accumulated enough materials to fill a truck trailer (ie. 48 pallets of metre-high boxes), no shipment of materials has been sent out yet.

Shipping is a significant cost when trying to recycle from the NWT. We have discussed shipping with a number of trucking firms which service the route between Yellowknife and Edmonton. One firm offered a couple of free loads if we would agree to use the company exclusively for shipping out materials. Another firm has offered to "profit-share", meaning that if they cover the shipping costs and if we share any money made selling the materials. We have also considered leasing a trailer which would be towed down at a lower cost than regular backhaul rate. Because of high insurance rates, Ecology North is not considering purchasing a truck trailor.

Another cost associated with shipping is loading. Some trucking firms prefer to do their own loading and unloading. With others it may be more economical to rent a forklift and/or pallet jack and have volunteers do the loading.

### 4.4 Amounts of Materials Collected

This section describes how much glass and metal was collected on the blue box curbside pick-up as well as the total weights of materials collected between June and the end of September.

In the four-month period of its operation, from June to October Ecology North received about 1500 pounds of aluminum, and several hundred pounds each of tin cans and the different colours of glass. We did not accumulate enough materials to fill up a truck trailer so did not ship the materials out[1]. This is not a huge amount of materials for a community the size of Yellowknife. We have identified several possible reasons for this:

- it takes several months at least for people to change their habits and remember to save recyclables;
- people didn't know about the depot;
- people didn't know where the depot was; or
- people did not have vehicles to drive out to the depot.

Table 1 (next page) shows the amounts of materials collected in the blue box curbside pickup by weight.

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[1]Shipping is more economical when paying for a whole truckload of materials rather than individual boxes or pallet-loads.

**Table 1: Materials Collected in Blue Box Curbside Pickup by Weight**

| Month | aluminum | tin | clear glass | green glass | brown glass |
|---|---|---|---|---|---|
| July | 257 | 150.5 | 381.5 | 438 | 52 |
| August | 180 | 170 | 278 | 232 | 61 |
| September | 223 | 158 | 452 | 290 | 68 |
| October | 187 | 142 | 188 | 180 | 51 |
| November | 168 | 165 | 150 | 228 | 60 |
| December | 305 | 210 | 310 | 288 | 55 |
| January | 180 | 145 | 269 | 250 | 48 |
| **totals** | 1500 | 1140.5 | 2028.5 | 1906 | 395 |
| **average total per month** | 214.3 | 162.9 | 289.8 | 272.3 | 56.4 |
| **average per person/month** | 1.7 | 1.3 | 2.3 | 2.2 | .5 |

NOTES: All weights are given in pounds. No weighing was done for pick-ups in June because participants had been stockpiling materials in anticipation of the recycling program starting. The total number of people participating was 125 individuals in 44 families. The averages shown per person are probably on the low side for the following reasons:

- people on the curbside program were selected on the basis of interest in recycling so may not be representative of the general population as they may tend to buy less items in cans and bottles in an effort to conserve;
- some of the volunteers put the materials they had collected on the curbside directly into the storage bins without weighing materials (two individuals are known to have done this at least two times each);
- some families were away on holiday for a month or more during this time period, without informing us.

## 5.0 EXPANSION OF THE PROJECT

Though Territorial Government funding for the project ended in September, the project was able to expand through the fall with the support of the business community.

A businessman from British Columbia, Joe Lotzkar, introduced himself to our group and informed us he was interested in assisting the program in some way. His business is based on metal recycling. He has experience assisting several non-profit ventures in western Canada.

Mr. Lotzkar felt that what Ecology North really needed for the project to survive economically was a machine to crush the cans. He made arrangements for one to be shipped to Ecology North at no charge. The machine crushes about five hundred cans into nineteen pound blocks which stack efficiently and are suitable for shipping. The advantage is that many more cans can be shipped out at the same cost. Appendix D contains information on the Dens-A-Can Model 500 metal densifier machine. It runs on electricity, and must be operated in an indoor space in temperatures above zero, celsius.

In August a local businessman, Fred Leonardis, let us know he had a vacant warehouse available in the industrial part of Yellowknife that he was willing to donate for use as a depot. Volunteers began preparing the building by insulating it and stapling up vapour barrier, nailing on roofing paper, reinforcing the roof rafters with collar ties (required by the City Inspector), constructing drop-off bins and chutes, constructing outdoor platforms under the drop-off chutes, staining the exterior, constructing a platform for the can densifier to stand on, making signs for the chutes and an overall sign for the building. In response to a radio announcement we received donations of used/extra plywood, paint and stain from the public. Some used lumber was collected at the City Dump.

The depot at the Yellowknife Co-op was not shut down as we were invited by the Co-op to continue operating it as a secondary "neighbourhood" depot.

In October an electrician informed us that the underground electrical cable did not meet electrical code requirements. Without funds to install a new cable or power pole, we began a three-month search for a generator powerful enough to run the can densifier. We also looked into ways to heat the building with a rented or donated heater or furnace.

The regional CBC Television current affairs program "Focus North" did a ten-minute segment on the recycling project in November,

showing the depot, the curbside pick-up and volunteers. The program discussed recycling in the context of distance from markets and the associated difficulties.

The Grand Opening of the depot in November was attended by supporters including volunteers, all three Yellowknife MLA's, and representatives from the City of Yellowknife, the Science Institute of the Northwest Territories, the Government of the Northwest Territories Department of Renewable Resources, and the Department of Government Services.

The Territorial Government's paper collection and recycling program got underway in the fall with Ecology North's involvement. The Department of Government Services is responsible for collecting the paper from government offices and storing it at the government warehouse. Ecology North is responsible for supplying storage containers (large cardboard boxes) and arranging shipping. The government donates the paper to Ecology North. So far four shipments of about 10 pallets of paper have gone out. The value of the paper comes close to covering the cost of shipping it to Edmonton. Territorial Government offices in other communities (Cambridge Bay, Inuvik, Fort Smith) are also initiating paper collection and recycling programs. Though Ecology North now had a warehouse, paper and cardboard were not added to the list of materials collected due to lack of dry storage space.

In consultation with people involved in the blue box curbside pick-up and based on volume of materials being collected, curbside pick-ups were cut back to once every two weeks instead of every week.

More recently a local firm began donating clean 45-gallon drums for use as shipping containers for glass (much more sturdy than cardboard containers). Many restaurants and offices, most of the schools in Yellowknife and the school in Rae-Edzo have begun setting aside materials for the depot. Power has been connected to the warehouse so the can densifier can be run without the use of a generator.

In the last three months collections at the depot have doubled and may be expected to continue to increase as more and more residents and businesses participate.

## 6.0 EXPENDITURES AND REVENUES FROM JUNE TO OCTOBER 1989

### 6.1 Expenditures

| | |
|---|---|
| administrative costs<br>(phone, advertising, photocopying) | 1158.66 |
| equipment<br>("we recycle" bins and small weigh scale<br>to weigh materials from blue box curbside pickup) | 1717.16 |
| building supplies<br>(lumber, paint, hardware, roofing supplies,<br>sign-making supplies, insulation and poly) | 1347.44 |
| operational expenses<br>(shipping for "we recycle" bins, cardboard<br>storage bins, steel banding for shipping bins<br>liability insurance, September rent for warehouse) | 1223.50 |
| part-time co-ordinator for 4 months | 5000.00 |
| **Total expenses =** | **$ 10446.76** |

### 6.2 Revenues

| | |
|---|---|
| donation for building supplies | 345.60 |
| sale of "we recycle" bins | 1788.00 |
| donation for September rental of warehouse | 750.00 |
| Renewable Resources grant | 8500.00 |
| **Total revenues =** | **$ 11383.60** |

## 6.3 Manpower Requirements

As shown below the total amount of volunteer hours for the four months was 595. The total amount of paid co-ordinator time was about 350 hours, bringing the total manpower requirement to 945 hours for the start-up period, equivalent to 1.6 full-time staff.

### Volunteer Contributions

10 recycling committee volunteers each donated an average of several hours time on a weekly basis for the life of the pilot project. Estimated value over the four months is:

| | |
|---|---|
| 10 people X 32 hours X $12 = | $ 3840.00 |

An average of 7 people helped with the blue box curbside pickup on 21 weekends.

| | |
|---|---|
| 7 people X 1 hour X 21 days X $8/hr = | $ 1176.00 |

On five weekends 8 volunteers assisted with preparing materials for shipping.

| | |
|---|---|
| 8 people X 2 hours X 5 days X $8 = | $ 640.00 |

roofing warehouse

| | |
|---|---|
| 3 people X 8 hours X $ 15.00/hr = | $ 360.00 |

insulating warehouse, construction of collar ties and storage containers

| | |
|---|---|
| 6 people X 4 hours X $ 8.00/hr = | $ 192.00 |

| | |
|---|---|
| **Total value of volunteer time = 675 hours or** | **$ 6208.00** |

## 7.0 ENVIRONMENTAL PARTNERS FUND

The Environmental Partners Fund is a funding initiative by Environment Canada designed to assist non-profit groups with two types of projects:

- cleanups of garbage or hazardous wastes; and
- recycling projects.

It is called a "partners" fund because applicants are expected to raise support for their projects from at least one source other than Environment Canada. Environment Canada then "matches" the support or funding the group has been able to raise.

Ecology North applied for an Environmental Partners Fund grant in August 1989, on the basis of the community, private sector and government support we had been able to raise. We were informed January 12th 1990 that our application had been accepted and that expenses from that date onward were eligible. The scope of the proposal included:

- operating a year-round depot open to all Yellowknife residents for a period of two years;
- working with the Government of the Northwest Territories Department of Government Services on their internal paper recycling program;
- continuing the blue box curbside pick-up of fifty families; and
- continuing to expand collections through public education and promotion, targeted pickups from businesses and at public events, and by setting up small neighbourhood depots to make it more convenient for people to contribute their materials.

The fund provides for a paid part-time staff person to manage and operate the expanding recycling program. Volunteers continue to assist with the curbside pick-up and most of the materials preparation, and with special activities such as dropoff depots at public events. Responsibilities of the staff person include both skilled labour and management:

- operating machinery, including the densifier, rented forklift and/or pallet jack, banding equipment, etc.;
- pickups of recyclables from neighbourhood depots, schools, and participating bars, restaurants and clubs;
- carrying out administration and publicity;
- contacting, scheduling and supervising volunteers;
- keeping books and maintaining records of interest to people looking into starting up recycling projects in other communities;

- maintaining communication with interested government agencies and the private sector;
- making presentations about the project to community groups, school children, etc.;
- being present at the depot as often as possible to meet people dropping off the recyclables and discuss the project with them; and
- overseeing the project.

## 8.0 EVALUATION

This section examines the project in terms of meeting the original objectives set out in the demonstration project proposal. The four objectives were:

- reduce waste;
- raise public awareness;
- private sector involvement; and
- demonstrate feasibility.

### 8.1 Reducing Waste

The project has reduced the waste stream in Yellowknife. In each of the material categories of aluminum, tin and glass, the recycling project captured 1.6%, 0.8% and 1.0% respectively of the materials disposed in Yellowknife[1]. This amounts to about 15 tonnes per year of glass, tin cans and aluminum, or slightly more than 0.3% of the total residential waste stream for Yellowknife.

This is regarded as a low estimate of the potential collections at a recycling depot for two reasons. Because of the poor location of the depot (the industrial section of town away from stores and residences) it is inconvenient for people to bring their materials to the depot. The project was not heavily promoted as it was being run by volunteers and Ecology North did not want to end up with more materials than it could handle. Collections have increased steadily since Christmas as volunteers have gained experience and hired a part-time staff person to manage the project, and as more City residents find out about the depot.

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[1] Calculated using figures from Stanley Associates Engineering Limited's report "Recycling Opportunities in the NWT" February 1990.

## 8.2 Raising Public Awareness

The project has raised public awareness of recycling in Yellowknife and other NWT communities. Ecology North received about 400 phone calls from Yellowknife residents between November 1989 and April 30 1990 regarding the recycling depot or recycling in general. People in other communities including Fort Resolution, Hay River, Rae-Edzo, Inuvik, Cambridge Bay, Fort Simpson, Fort Norman and Iqaluit have also called for information or assistance. Classes at most schools in Yellowknife have called to ask for tours of the depot or to have an Ecology North volunteer come to speak to their class about recycling. Several schools in Yellowknife including N.J. McPherson School, Sir John Franklin, Mildred Hall School and St. Pat's are establishing dropoff depots on their properties. Most restaurants in Yellowknife are beginning to set aside their aluminum cans for collection by Ecology North. Various local businesses, and institutions and groups such as Ptarmigan Mine, Ruth Inch Memorial Pool, the Arctic College Community Health Representative program and the Registered Nurses Association have requested and received information on Ecology North's program and how they can assist in recycling. The very strong volunteer component also highlights the public commitment to the project.

## 8.3 Private Sector Involvement

As indicated in the report, several local businesses are cooperating with Ecology North by donating materials, storage space and materials as well as in-kind services. Shipping of paper is provided at discounted rates and there is increasing interest by local businesses to contribute materials and provide services at no cost.

## 8.4 Demonstration of Feasibility

The project has demonstrated that it is possible to run a recycling project in Yellowknife. Since shipping of a load of glass, tin and aluminum[1] has not taken place as yet it is not possible to determine what will be required for economic feasibility (ie breaking even). Clearly this project has numerous subsidized inputs, such as volunteer labour and donated space, that would not be provided to a private business. The fact remains that volunteer support has remained high and that the project has been able to maintain momentum since its initiation.

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[1]Office papers and computer papers collected in GNWT offices have been shipped out by Ecology North.

Many public services such as waste disposal are subsidized through public funds. Recycling is recognized as a key component of any integrated waste management system, requiring input of public funds to keep it operational. To date the project would not have been able to proceed without such funds. As time goes by and markets stabilize we will be better able to assess what level of public funds are required to keep this project going. A system of deposits could also provide a mechanism to support recycling in NWT communities.

## 9.0 RECOMMENDATIONS

Ecology North's recycling project has been exploratory in nature. Members gained experience collecting, storing and preparing materials, organizing volunteers, and working with government agencies and the private sector. Thousands of Yellowknife residents have become involved in recycling on a day-to-day basis at their school or place of work, or as they got into the habit of separating their recyclable materials at home to bring to the depot or to place in their curbside pick-up bin. This section is based on the experiences of people involved in the Yellowknife program.

### 9.1 Materials Preparation and Storage

A winterized, heated, electrically serviced facility is recommended for sorting, preparing and storing materials. Ecology North found the outdoor depot to be inadequate for winter recycling. It is very difficult to sort and prepare materials in the snow, cardboard storage containers get soggy, tins rust, and ravens poke holes in plastic storage bags. An indoor "facility" could consist of a truck trailor if, for instance, only pop and beer cans were collected. Where more than one material is to be collected we recommend the use of a warehouse so workers and/or volunteers have enough room to safely process materials.

### 9.2 Size of Project

Small-scale recycling projects should start small and work up. This gives residents a chance to get used to the idea that different materials must be separated and prepared differently. People assume, for instance, that tin foil can go in with the tin cans. At the Yellowknife depot small quantities of newspapers, glass jar lids, foil, broken window glass, styrofoam, plastic pop bottles and cardboard juice boxes are occasionally dropped off with the other materials. Separation of materials must be promoted. New materials may be introduced one at-a-time.

## 9.3 Volunteers

Volunteers can run a recycling program, but a core group of committed people must be found to be responsible for operating and promoting the program and for finding volunteers to do all the work on an ongoing basis. Our experience is, it's going to be more work than you think. The important thing is to be sure you have enough volunteers committed over the long term to sustain the project. There should be people willing to do the materials preparation as well as the co-ordination. If there is funding available it is a good idea to budget for gas and other expenses of volunteers.

## 9.4 Variable Markets

During the course of the Yellowknife project the value of newspaper dropped from $45 per tonne to $10 per tonne in Edmonton. The glass recycling plant and the plastic bag recycling plant in Alberta closed down. No other buyer of plastic bags was located, however there is a glass factory near Vancouver we will be able to use. Recycling programs must be flexible enough that they can stop collecting a certain material or have room to stockpile it if a market disappears. Systems of collection, storage, preparation or shipping may have to change from time to time in order to keep costs down.

## 9.5 Unanticipated Expenses

Project co-ordinators have to be prepared on an on-going basis to seek additional donations and/or funding as required. Expenses are bound to come up which are not anticipated. Ecology North had unexpected electrical costs (installation of a power pole and rewiring the warehouse). Another unplanned expense was the need for a truck belonging to the project (rather than relying on people's personal vehicles to do daily pick-ups of materials, etc.). We are trying to arrange for a truck to be donated.

## 9.6 Government Support

Revenues from small-scale recycling programs are not sufficient or continuous enough to keep them going over the long term. Some from of government support is necessary. This may be provided in the form of direct subsidies, or in the form of infrastructure (ie. deposit legislation, provision of free storage, etc.).

# APPENDIX A

## SELECTED ARTICLES ON RECYCLING

# Recycling down in dumps

By SUZY HAMILTON

Recycling paper is going to be a flop in this province if we don't face a few facts.

First, human beings — who are clamoring for recycling even in the hinterlands of B.C. — are lazy.

The guy who's been saving newspapers since 1986 in his basement still wants someone to pick them up, even if he only has to dump them at a downtown depot 10 blocks away.

School kids in Nelson are trying to raise money for Environment Week June 4-11 by recycling newspapers.

With the proceeds, they will save endangered animals or buy a share of the tropical rain forest from Forest Wildlife Fund. Because prices are so low, the seven schools will make just $175 for six tonnes.

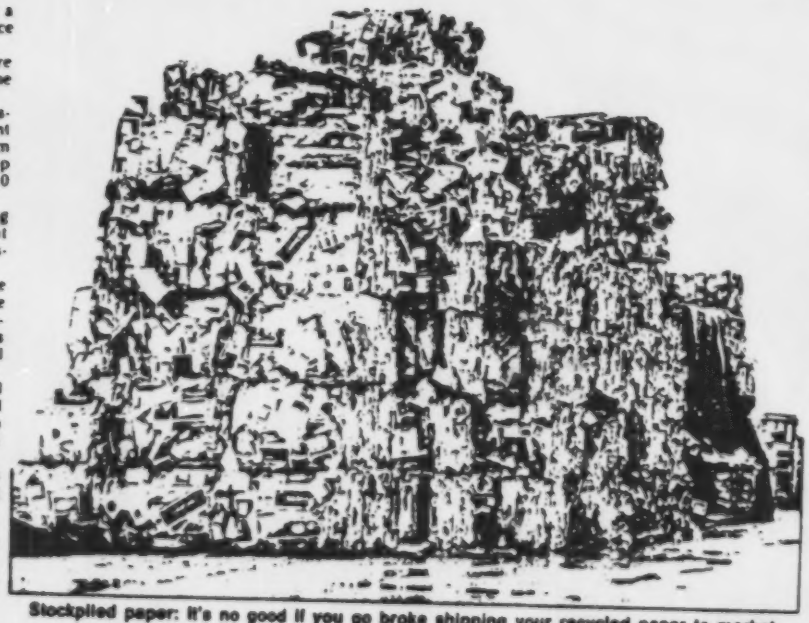
Yet in their idealistic, wonderful way, the kids are gathering bits and bundles, arriving at the conclusion that global problems affect everyone.

"It was easy getting into this mess; it's going to be hard getting out," said one sixth grader.

But do you think the aforementioned gentleman will bring his papers to the depot, which has been donated for only one Saturday by the hard-pressed (read lazy) city for this project? Double nu.

So let's assume that the rural areas — a substantial portion of B.C. if you call Kamloops and Kelowna "rural" — get subsidies to initiate curbside recycling. (Otherwise they'll go broke shipping their product to market.)

Who is going to buy the used paper? We are at the whim of the supply and demand cycle.



Stockpiled paper: It's no good if you go broke shipping your recycled paper to market.

Paper prices have fallen by half since last summer as cities like Vancouver come on stream. And experts predict it'll get worse.

The glut has caused Kelowna Recycling to stockpile 85 tonnes of newspaper until prices change.

Creston burned 50 tonnes of paper because it couldn't afford to sell the contents. Vernon laid off its co-ordinator in order to meet the pick-up drivers' payroll.

Meanwhile, B.C. residents are daily growing more aware of the rising costs and perils of landfills. And they have decided that recycling is their inalienable right.

Schools are teaching the new three R's of the '80's: Re-use, reduce and recycle. Economists are adding a fourth: Recover.

But we're teaching our kids these values while what little we do recycle pours into the U.S. and overseas at ridiculously low prices.

What's to be done? The simplistic answer that government must subsidize recycling is only part of the solution.

It's not going to do folks in Burns Lake or Dawson Creek any good to collect paper if they have no way to remanufacture it. Or if it's going to cost so much to sell it they eventually burn the paper.

Here's what the goverment, which has studied the problem to death, can do: Issue a policy that government must use a substantial percentage of recycled paper, creating a demand.

Add that every community must recycle, creating a supply. Insist that pulp mills use a percentage of recycled fibre in virgin feed (pulp from wood chips).

If pulp mills can be forced to clean up dioxins, they can also use some of their hefty profits to clean up the dumps as well. Paper alone comprises almost one half the trash B.C. throws away annually.

All of this costs the taxpayers nothing and encourages industry to develop here. But it will take time. It is imperative to act now.

Critics will say that B.C. doesn't have the population to sustain a $35 million de-inking plant which we now lack. But those same critics admit that if everyone recycled, we could pull it off.

That's not such a difficult goal for a sixth grader in Nelson, but it might be a bit much for the rest of us well-intentioned but indolent recyclers.

*Suzy Hamilton is a writer living in Nelson.*

# Blue boxes in black; under-employed also are recycled

By LASHA MORNINGSTAR
Journal Staff Writer

Those blue recycling boxes are already turning a profit for the citizens of Edmonton.

"We are showing a profit now in our monthly operations," said Dr. Cornelius Guenter at the official opening of the Edmonton Recycling Society's facility.

"It is not a large profit, but we are in the black." But Guenter, the society's executive director, had no exact figure.

The first full blue box was picked up from its north Edmonton curbside on Oct. 31, 1988. The recycling society collects tins, newspaper and glass from 61,000 homes in the north part of the city. A private company, Browning-Ferris Industries, looks after the south side.

Once the discarded former refuse has been sorted, it is sent all over the world — the glass to Redcliff, phone books to Taiwan, newspapers to Korea.

And there is a recycling of people, too. Twenty-five handicapped people have been taken off the unemployment and welfare roles, trained and turned into working taxpayers.

The non-profit society is financially underwritten by the Mennonite Central Committee.

Guenter said this is the relief and service arm of the Mennonites who have been active in recycling for years.

"Our motto is 'Conserve creation and create employment,' " he said.

"And my motto is 'I am motivated by humanitarian cause and governed by profit.' "

New Democrat environment critic John McInnis said "these are not welfare people sorting garbage. They are radiant, working when they would otherwise be unemployable and turning garbage into a valuable commodity."

The Jasper Place MLA applauded the fact the profits are being returned to the city and said he looked to the future when almost all of the city's garbage will be recycled as now happpens in Seattle.

Guenter said criticism of his program comes from those who think it is subsidized.

"The recycling program receives absolutely no subsidy. We have a contract. We are free-standing."

He said the environmentally concerned facility and the city have been receiving enquiries about their operation from all across North America.

"The business is relentless. We have to be quite realistic on market realities, create a humane climate in our plant and within the community. Many will be watching us very closely to see if we will perform up to our stated expectations."

Environment Minister Ralph Klein, performing his first official function as a cabinet minister, said Calgarians are also crying out for a recycling program.

# RECYCLING COMES OF AGE

## LONG A FRINGE ACTIVITY BOOSTED BY MANY AND PRACTISED BY FEW, RECYCLING HAS FINALLY MOVED INTO THE MAINSTREAM

BY DOUG HICKMAN

I almost missed the sign announcing my arrival at the South Berwick Landfill and Recycling Depot. Faded red lettering on cracked white, it stood back from the concession road on a gravel track leading through some scrubby trees. Braking sharply, I turned onto the track and drove through the trees to a paved area beyond, where I parked atop a 6-metre cliff marking the edge of the landfill. On the other side of the parking lot stood a steel-clad industrial building that could have been a warehouse in any U.S. community. Over the door, a new sign identified it as the Recycling Depot, open Mondays, Wednesdays and Saturdays. With an acute sense of déjà vu, I climbed out of the car and, this being a Monday, went to find the manager.

I was in the middle of a ten-day fact-finding tour of New England recycling programs. I had lost count of the number of depots I had visited over the past week, but they were all the same, operating against the odds of administrative indifference and community apathy, gestures against the insatiable appetite of a myriad of small, local landfills. Even before entering the depot I knew what it would look like inside, what materials were recycled through it, what answers the manager would give to the questions this stranger from another country was about to ask.

When I drove back down the gravel track to the concession road an hour and a half later, my premonitions had been confirmed. Inside the depot, large containers for glass jars and metal cans stood against one wall. Against another, baled cardboard and newspaper were stacked 3 metres high. Outside, more baled cardboard and newspaper stood against a fence in the gathering snow of a blustery, chill morning of November-grey. Further along the fence was a small tank for used oil.

The manager's story was one I had heard over and over during the week. He was never sure whether he would be able to find a buyer for the material brought in for recycling. Few people actually used the depot. The town would not provide the funds for it to open daily. Did the depot make any difference to the amount of waste being dumped in the landfill on the other side of the parking lot? "I guess it must," the manager told me, "but not so that you'd notice. Sometimes we even have to dump what comes into the depot for recycling, when we can't sell it." A part-time facility providing a service most people couldn't be bothered with in an industry that was marginal, at best.

Bill Caulfield Browne

*Above: Two years ago, only a handful of communities in Ontario had a curbside or "blue box" recycling program. By the end of 1988, almost 50 municipalities will have programs serving half of the province's population. Left: In Toronto, a constant line of garbage trucks spew their contents for landfill or incineration. On average, every man, woman and child in Ontario generates about 1 kilogram of garbage a day.*

*Like many municipalities, metropolitan Toronto is faced with the alarming prospect of having nowhere to dump its garbage. With a nearby landfill almost full, the city is looking to temporarily re-open the Beare Road dump (above), which closed in 1985. Local residents are protesting that the expansion would destroy prime agricultural land and a marsh.*

Rural New England, I had been assured in far-away Toronto, had some of the most dynamic recycling programs in North America. If the war against waste was to be won, it would happen here first. The South Berwick Recycling Depot in southern Maine, a few minutes' drive from picturesque Kennebunkport and the salt-water marsh that was Rachel Carson's stomping ground—this, along with other New England depots, was as good as recycling got. This, I reflected ruefully as drizzle mixed with the snow smearing the windshield, was the state of the art.

In the six years following that chilly day in Maine, a revolution in recycling has begun in North America. The well-intentioned, but minor, contribution of recycling to waste management in t 1970s and early 1980s has emerged a major social movement of the late 198 Nowhere is this more apparent than Ontario, where first Kitchener, then Mi sissauga and then Ottawa mounted rec cling programs. Each, at the time of inception, was the largest recycling pro gram on the continent.

The recent progress of recycling i Ontario is the result of an unlikely mix o high finance, environmental posturing and political two-steps that have made bedfellows of some most unlikely characters and interests. The environmenta vital statistics of the garbage world can be starkly summarized: on average, every man, woman and child in Ontario generates approximately one kilogram of garbage per day. Ontario households produce over 3 million tonnes of residential solid waste annually. Over 4 million more tonnes are generated by the commercial and industrial sectors. From an environmental point of view, energy and material resources are squandered and our environment is raped in the quest to manufacture products for a one-way trip to the 1,500 or so landfill sites that scar the landscape of Ontario.

# RECYCLING COMES OF AGE

Against this background, environmentalists have long argued the ecological sanity of reducing waste generation and of reusing and recycling the waste we do generate. In particular, the corporate giants of the packaging industry were challenged by environmentalists in the 1970s over the issue of nonreturnable soft-drink containers and the contribution of these containers to litter in the province. The Science Council of Canada lent academic credibility to the conservation argument with its report "Canada as a Conserver Society," and the various energy crises of the 1970s made *conservation* a household word. As the 1970s yielded to the 1980s, however, recycling remained a fringe activity boosted by many, but practised by few.

If environmentalists were disappointed by the lack of recycling progress in the early 1980s, the soft-drink industry was equally disappointed by provincial regulations that effectively banned aluminum cans, plastic bottles and other new nonreturnable beverage containers. Supposedly, the provincial government banned these containers because of their potential to contribute to litter problems. Since consumer preference for the new containers over traditional returnable bottles and steel cans had been amply demonstrated in the U.S., the manufacturers and potential users of the new containers felt they had been unfairly discriminated against by a normally pro-business Tory government.

The government's response to environmental concerns regarding waste management and to industry concerns regarding discriminatory regulations did not satisfy anyone. As the Ministry of the Environment (MOE) failed to enforce its own regulations to ensure the use of refillable soft-drink containers, it became clear that the banning of new types of nonrefillable containers had little to do with litter and a lot to do with preserving jobs in the Hamilton steel industry—jobs that might have been threatened if the new container types, particularly aluminum cans, had been allowed to compete with steel cans. Province-wide efforts to boost recycling were viewed by environmentalists as poorly focused and inadequate; municipalities, who are responsible for residential waste collection and disposal, almost without exception ignored the Ministry of the Environment's programs to encourage recycling.

By the fall of 1982, the idea that recycling could play a significant role in waste management in Ontario—or anywhere else—was generally viewed in industry and government as an environmentalist's pipe-dream. The recycling depots scattered through Ontario and the rest of North America were useful as fundraisers for community groups, but the amount of waste recycled through them was insignificant in waste management terms. If recycling was to fulfill the dreams of its boosters, a major new effort would be required. Even as I stood in the autumnal squalls of South Berwick, Maine, in that same year, however, the groundwork was being laid in Ontario for just such an effort.

> ***BY YEAR-END, HALF OF ONTARIANS WILL HAVE CURBSIDE RECYCLING***

Frustrated by the regulations that prevented the use of aluminum cans for soft drink containers, Alcan, a giant of the industry, proposed a radical solution to the problem: if the government would permit aluminum soft-drink cans in Ontario, Alcan would establish and support a province-wide network to recycle not only the cans but all other recyclables in the residential waste stream as well. The proposal was bold and imaginative, and it won the support of environmental groups such as Pollution Probe and the Recycling Council of Ontario. The proposal also gave the government the opportunity to reassert its recycling objectives and to involve industry in accomplishing its recycling goals. Most importantly, from a political perspective, any job losses in the steel industry would be more than compensated for by jobs created in the proposed recycling program.

The Ministry of the Environment considered the proposal, and alternatives to it, for three years. Finally, late in 1985, it announced a complicated regulation that allowed aluminum cans and other new soft-drink containers on the market. The regulation specified that at least 40% of packaged soft drinks must continue to be sold in refillable containers and that at least 50% of the remaining containers must be being recycled by November 30, 1988. The Recycling Advisory Committee (RAC) was established to advise Environment Minister Jim Bradley on progress toward meeting these goals.

The challenge to the soft drink industry to comply with the recycling requirements of the regulation was formidable. If the terms of the regulation were to be met, curbside collection recycling programs would have to be established throughout the province in just three years. To accomplish this, the RAC established Ontario Multi-Material Recycling, Inc. (OMMRI) to channel private sector funds into new recycling programs. Since then, OMMRI and the MOE have engaged in a bidding duel that currently calls for OMMRI to spend $20 million by early 1991 and the MOE to spend $27.5 million by the end of 1992 to support the development of residential blue-box recycling in Ontario. Just a few short years ago, this political solution to the desperate state of recycling in the province was unthinkable and the bedfellows in the solution were unimaginable: as they meet around the boardroom tables of RAC and OMMRI, the likes of Pollution Probe, Pepsi and Stelco are now charting the course of recycling in Ontario hand-in-hand.

While the corporate and political manoeuvres and lobbying that have characterized the soft drink container issue are resulting in unprecedented corporate sponsorship of recycling, most of the activity has been far removed from public view. In sharp contrast to the decorum of corporate boardrooms and Queen's Park hallways, the future of recycling has been immeasurably enhanced by public anger at the inability of municipalities to plan for future waste management needs. Traditionally an item of low priority for municipalities, garbage suddenly finds itself at the head of the municipal agenda and an issue that can make or break political careers.

Ontario is facing a waste management crisis of previously unimagined proportions. The Ministry of the Environment estimates that approximately 175 currently operating municipal landfills will be full by the end of 1990, and many municipalities will not have new sites approved before the old ones fill up. Ministry officials estimate that approving new waste management facilities takes an average of five years, although the Region of Halton, just west of Toronto, has spent ten years trying to do just this without success and is now trucking garbage to an incinerator in New York State. In the Ottawa Valley south of Pembroke, several small municipalities joined together to establish, and share the costs of, a new landfill. Two and a half years and $65,000 later, the plan was scuttled when one of the municipalities abruptly pulled out of the agreement after learning that the new landfill would probably be located within its borders. Five hundred kilometres away, near Lake Huron, the town of Seaforth (population 2,200) has embarked on its third try in five years to site a new landfill; its failures to date have cost over $200,000. Municipalities on Georgian Bay are being forced to truck their garbage to Metro Toronto's Keele Valley site over 100 kilometres away. Metro Toronto is scarcely in a better position, though—the Keele Valley is projected to be full by 1993, and Metro is currently in the early stages of a race against time to have new facilities approved and established by that date. And everywhere people fight against living next door to a landfill by setting up adversarial citizen groups—MAD (Maidstone Against Dumping) in the Windsor area, TRAID (Tecumseth Ratepayers Against Irresponsible Dumping) near Barrie, and PACT (Pickering-Ajax Citizens Together), fighting Metro Toronto landfill proposals east of Toronto.

Driven by the prospect of not having anywhere to dump their garbage and enticed by the unprecedented millions of dollars being pumped into recycling by the province and OMMRI, municipalities are now turning to recycling with an enthusiasm matched only by their disdain for it as little as five years ago. At the beginning of 1986, only a handful of municipalities in Ontario had a curbside collection recycling program; by the end of 1988, OMMRI estimates that at least 44 municipalities will have curbside collection programs serving half the province's population. These programs promise to double the amount of waste recycled from the approximately 55,000 tonnes recycled in 1986. The benefits to the environment of recycling are direct: over 600,000 trees were saved from the chainsaw by recycling 40,000 tonnes of newspaper in 1986.

As garbage has become big business and a high-profile item on the environmental and political agendas, so the language used to debate the issues has itself evolved. The new lexicon provides squeaky-clean images of *solid waste management* and *recycling*, but this new-found respectability does not sit easily with traditional images of dusty garbagemen and sharp-eyed scrap-dealers. Recycling still amounts to salvaging materials that would otherwise be part of a very large and very messy garbage heap.

Messy though it is, residential garbage is largely composed of a few major categories of materials. Paper of all kinds makes up about a third of our garbage. Another third consists of putrescible wastes such as leaves, grass clippings and kitchen scraps. The remainder is made up mostly of glass, food and beverage cans, and plastics in a variety of forms. Beverage containers of all kinds constitute less than 2% of all residential waste—a minor percentage out of all proportion to the efforts focused on recycling the containers. Packaging of all types, however, makes up more than a third of the total.

Today's state-of-the-art recycling programs in Ontario have their roots in a program developed in Kitchener in the early 1980s. There, Laidlaw Waste Sys-

## TEN GREAT WAYS TO GET GOING

**Do you want to recycle, but don't know how to get started? Or perhaps you recycle already, but would like to get more involved in recycling and waste management issues. Whichever is the case, there are lots of ways to participate. Here are ten to get you going:**

**1.** Start a compost pile. You can buy compost containers from garden supply stores or make your own. Start with organic matter, add some soil to get the pile going and let nature do the rest. Composting takes up little space, doesn't smell and provides a free, high-quality soil additive.

**2.** Buy products in recyclable or reusable containers. Many containers are now identified as being recyclable, reusable or refillable. Better still, whenever possible buy products that don't require containers, such as items that can be purchased in bulk.

**3.** Don't throw it out—use it! Look for opportunities to put junk or "garbage" to new use around the house, in the garden or at work.

**4.** Find out what recycling opportunities are available in your community. A phone call to your public works department, town office, recycling program operator or garbage collection contractor will tell you how to recycle in your area.

**5.** Start a recycling program in your community, office, school, factory, etc. Decide what can be recycled, where the material can be sold, how people can participate, how the program should be organized and either write a proposal or get started right away.

**6.** Advertise the success of your community's recycling efforts. Nothing succeeds like success, so make sure everyone knows how much your community recycles and the benefits recycling brings to your community.

**7.** Join a recycling organization. You can become a member of the Recycling Council of Ontario (phone 416/593-1756) or a member of your local recycling community group (your town office or library will likely be able to put you in touch with the right person).

**8.** Make presentations to local schools and community and business groups. Tell them the benefits of recycling and how they can participate or start up new programs.

**9.** Participate in waste management planning. Municipalities throughout Ontario are undertaking major waste management planning efforts. In most cases, public input is critical to these plans. Phone your public works department or town office and become involved in making sure that recycling is in your community's future.

**10.** Lobby your political representatives. Write to your councillor, mayor, MPP and the minister of the environment and tell them you want more and better recycling services. This is even more effective if you organize a poll that is representative of your area or community and demonstrates widespread support for recycling. The provincial minister of the environment is Jim Bradley and he replies to all letters he receives. His address is: 15th Floor, 135 St. Clair Ave. W., Toronto M4V 1P5; his phone number is (416) 323-4360. □

# RECYCLING COMES OF AGE

tems, now one of the largest waste service companies in North America, launched a city-wide recycling program in 1983 that continues to be a model for recycling programs across the continent. At the heart of the program are the blue recycling boxes that were distributed free to the 33,000 single-family homes in the city and the specially designed trucks that can efficiently collect materials for recycling.

Old newspapers, metal cans and glass containers are recycled in the Kitchener program. Residents store their recyclables in their blue recycling boxes. Once a week, on the same day as regular garbage collection, the boxes are set at the curb. The recyclables are picked up by the recycling trucks and the boxes left for the residents to take back to their houses. The recycling trucks take the recyclables to a handling and processing depot, where they are prepared for sale to manufacturers as raw materials.

It is the Kitchener model of recycling that is being so heavily promoted by OMMRI and the MOE and adopted by municipalities across Ontario at such a fast pace. Now known as "blue-box" recycling in honour of the containers, these programs have demonstrated their popularity with the public to skeptical solid waste management officials wherever they have been introduced. As many as 80% and more of the population served by these programs actually recycle. This in turn has prompted a bevy of researchers to ask why, in our fast-paced, throw-away society, so many people participate in these recycling programs. The answer, it turns out, is deceptively simple: it makes people feel good to take part in something that conserves resources and helps preserve the environment.

It has long been known that when people are asked about their attitudes to recycling, a large majority typically respond positively. Until the Kitchener program, however, participation in recycling programs had been disappointingly low. The demonstration of people's willingness to participate in convenient, regular and professionally operated recycling programs has changed forever traditional attitudes that garbage is only good for throwing away.

Blue-box recycling is the cornerstone of OMMRI's recycling efforts and at the heart of Environment Minister Jim Bradley's call, made in October 1987, for recycling 50% of Ontario's household waste. Environmentalists like John Hanson, of the Recycling Council of Ontario, and Colin Isaacs, of Pollution Probe, wonder why we shouldn't aim even higher than Bradley's target. Hanson points to communities in Japan, Europe and the U.S. that manage to recycle much more than 50% of their garbage—for example, the town of Hamburg, New York, just across Lake Ontario, recycles up to 90% of its garbage. Hanson believes that Ontario could come close to matching that figure. Even without technological changes, as much as 25% of this province's garbage could be being recycled in just three years, says Hanson. He suggests starting toward this goal with the composting of all yard waste in addition to province-wide blue-box recycling.

*The township of South-West Oxford, near Woodstock, is one of the few communities in Canada with a mandatory recycling program. Glass, tin and newspaper must be separated from waste. Garbage that has not been separated will not be picked up by the township. Recyclables go into the bins towed behind the garbage truck.*

Colin Isaacs goes further, bluntly stating that nothing should go to landfill if it is recyclable and applauding Halton Region's proposed ban on the landfilling of corrugated cardboard from industrial and commercial businesses. To demonstrate just how much of our garbage can be recycled, Pollution Probe launched an intensive recycling demonstration project in North York, a metropolitan Toronto, this spring. While the results of this effort are not yet in, a similar effort in East Hampton, New York, recently resulted in recycling 64% of garbage in the study area. Even Bob Flemington, president of OMMRI, agrees that much more waste could be recycled today. He views current recycling efforts as "a springboard for networking into a much larger recycling effort." Clearly, in the crisis world of solid waste management: recycling is an idea whose time, everyone agrees, has finally come.

Amid the swirl of rhetoric and forecasts of a golden future for recycling, it is easy to overlook the fact that only some 3% of the province's garbage is now recycled. With all the talk, money and self-congratulation of recent years, why isn't more actually being achieved?

Paradoxically, the limitations of the current blue-box system itself are a major problem. The newspapers, metal cans, glass jars and plastic bottles that are increasingly recycled make up only a maximum of 20% of residential waste, leaving at least 80% of residential waste untouched by blue-box recycling programs. Also, blue-box recycling programs serve neither people living in high-rise buildings, nor the industrial and commercial sectors that generate half the waste now being buried in our landfills. While there are many ideas on how to address these problems, most have not yet been implemented beyond the pilot stage. Municipalities are becoming increasingly committed to long-range recycling, however, and several have recently hired staff dedicated to developing new waste reduction and recycling initiatives.

Unfortunately, while some municipalities have embraced recycling, others remain reluctant to support even blue-box programs. Some of this reluctance focuses on the costs of recycling, which many municipalities find hard to justify against what may be a cheaper landfilling option—although many municipalities still have no accurate idea of what waste collection and landfilling really cost them. Landfill costs are rising throughout the province, however, and this year Metro Toronto is leading the way by increasing the cost of dumping at its landfill sites from $18 per tonne to $50 per tonne in an effort to conserve its rapidly diminishing landfill capacity. As waste disposal costs rise, recycling becomes more economically attractive.

More importantly, a major battle is shaping up between recycling and technologies known as energy-from-waste (EFW), which involve burning garbage and recovering the resulting energy for sale—as steam for municipal heating systems, for example. The recycling of non-combustible materials, such as metal cans and glass jars, is compatible with EFW systems, but additional recycling may not be, since the reduction of the waste stream through recycling makes EFW less cost-effective on a per-tonne basis and may result in a failure of the EFW facility to meet contractual obligations to sell energy. Large EFW facilities can cost a hundred million dollars or more. Municipalities that invest millions of dollars in EFW are unlikely to promote recycling beyond existing blue-box programs.

Certainly, the future of recycling will depend to some extent on economics. Revenues from the sale of materials recovered through most residential recycling programs are not enough to cover the costs of the programs. The millions of dollars the MOE and OMMRI are pouring into recycling represent a subsidy without which most programs could not survive. When the costs of other waste management options rise, as they are doing at the moment, recycling becomes more cost competitive and less in need of subsidies. In many parts of Ontario, particularly in rural and northern areas, recycling is still expensive compared with landfilling.

Part of the cost-effectiveness equation is the value of recyclables as a resource to industry. The more valuable they are, the more effort industry will put into recovering them. Current industry efforts to develop plastics recycling programs and recently announced investment plans to double the market for waste newspapers in Ontario augur well, but all too often using virgin raw materials is still cheaper and more dependable than using materials recovered through recycling programs.

Despite the problems it faces, recycling offers exciting possibilities to the world of solid waste management—a world where environmental protection is too often equated simply with regulatory paperwork and technical standards for garbage disposal. More than anything, recycling is about people and the choice they make to play an active role in conserving resources and preserving the environment. The question is no longer whether or not recycling can work, but how high a priority we put on it as a tool to manage the "waste" we generate.

Government and industry response to the demand for recycling has been impressive in recent years. While neither the vote-getting concerns of our politicians nor the corporate environmentalism of industry embody the purest of environmental motives, recycling is currently a highly attractive vehicle for both. What is really important is that, increasingly, recycling issues are dictating industrial and political decision-making—and the environment is the winner. It's up to all of us to keep it that way.□

*Formerly with the Ministry of the Environment's Waste Management Branch, Doug Hickman is a waste management consultant. He lives in Stouffville, Ontario, where he is president of the community's recycling group.*

## TWO MINUTES A DAY

*Recycling glass at a community depot on Saturday morning: a local recycling program generates income and significantly reduces the municipality's disposal costs.*

**Can recycling make** much of a difference in the amount of garbage produced by an individual and his community? Just ask Doug Hickman.

Hickman and his wife live in Stouffville, northeast of Toronto. Stouffville does not yet have a curbside collection recycling program, but it does have a local recycling group, which Hickman heads. The group operates a recycling depot with the support and assistance of the town and the local waste collection contractor.

Cardboard, glass containers, metal cans and newspapers can all be recycled through the depot. The Hickmans flatten their cardboard and stack it beside their newspapers in the basement. They rinse all glass containers and metal cans and store these in a box. Every three or four weeks they take their recyclables to the recycling depot, where each material is placed in a large container. When the containers are full, the recyclables are sold by the recycling group to an industrial manufacturer.

Last year the group recycled 185 tonnes of material, up 12% from 1986. This "waste" netted the group $4,300, most of which will be donated to other community projects. The community also benefits directly from reduced waste disposal costs. Hickman estimates that the municipality will save about $10,000 this year in trips to Metro Toronto dump sites, where landfill tipping fees have skyrocketed.

Impressed by the recycling group's activities, the town council has committed to starting a curbside collection program this fall. Hickman believes that the program will immediately triple the amount of material recycled, based on the experience of other Ontario communities.

The Hickmans also maintain a compost pile in their backyard. They compost all their kitchen scraps, except meat, as well as leaves and grass clippings. The compost pile does not smell and does not attract rodents. Every spring they add fresh compost to their garden for healthier vegetables and flowers.

How much time does it take to recycle and compost on a regular basis? The Hickmans estimate the total at no more than two or three minutes a day. How much difference does this make to the amount of garbage they take to the curb each week? "We recycle about half our garbage," says Hickman. "Recycling has become a habit for us. It's one way—a very easy way—we can help protect the environment."□

# APPENDIX B

## LIST OF RECYCLING CONTACTS AND BUYERS OF MATERIALS

## APPENDIX B:
## LIST OF RECYCLING CONTACTS AND BUYERS OF MATERIALS UTILIZED BY ECOLOGY NORTH

| Name of contact/ phone number | Organization/ purpose of contact |
|---|---|
| Norm Summerfeld<br>Dave Bishop<br>403-468-1133 | Stelco does not purchase tin cans directly from recyclers, but can provide names of scrap dealers and give background on how tin can recycling works. |
| Dr. Gunther<br>403-471-0071 | The Edmonton Recycling Society is the chief buyer of Ecology North's materials, and manages recycling for the City of Edmonton |
| Joe Hruska<br>416-528-2386 | Canadian Tinplate Recycling Council, in Hamilton can advise about tin can recycling from the industry point-of-view |
| Glen Cohen<br>403-438-5107 | Myers Metals buys waste aluminum cans in Edmonton |
| 403-279-2724 | Shred-a-can Recyclers buys waste aluminum in Calgary |
| John Hanson<br>416-960-0938 | Recycling Council of Ontario can give general advice on depots and recycling programs |
| Rick Dvorkin<br>403-4262-4542 | Recycling Council of Alberta can give general advice on depots and recycling programs |
| 403-433-8711 | Environmental Resource Center in Edmonton has information on buyers of recyclables |
| Alvin Ballachay<br>447-1048<br>447-1255 | Allied Paper Savers purchases waste office paper and can advise on paper recycling and paper prices in Edmonton |

| | |
|---|---|
| 403-464-4761 | Paperboard Industries Corporation purchases waste office paper in Edmonton |
| Joe Lotzkar<br>604-327-1148 | Pacific Metals is a large metal recycling company in western Canada which has also assisted many small non-profit groups with recycling |
| Jim Dixon | Alcan has purchased Pacific Metals interest in recycling and is willing to offer advice and support where it can |
| Bernie Plaquin<br>403-874-2450 | can quote shipping rates for CP Rail |
| Glenn Pembry<br>416-626-6446 | A-1 Products supplies blue plastic "we recycle" bins |
| Bruce Mooney<br>412-367-2686 | Mooney specializes in recycling equipment such as can crushing machines, located in Pennsylvania |
| Doug or Valerie<br>403-478-3451 | I & S is a produce wholesaler that can supply large cardboard containers when they are available. |

# APPENDIX C

## INFORMATION FLYERS FOR RECYCLING PARTICIPANTS

# CURBSIDE PICK-UP GETS UNDERWAY

Congratulations! You are part of Yellowknife's first recycling program. You can sleep more peacefully at night knowing you are doing something to help reduce pollution and waste of resources.

The purpose of this project goes beyond simply reducing the amount of garbage being disposed of in Yellowknife's dump. It will demonstrate the feasibility of recycling in the North. We want to show the City of Yellowknife how it is possible to recycle a variety of waste materials and break even.

## How it works.

Before you throw things away, separate out the recyclables. We're beginning with four materials: aluminium cans, steel (tin) cans, glass bottles and plastic grocery bags.

**Here's how to get stuff ready:**

**Aluminium cans** should be fairly clean and crushed flat as you can get them.

**Steel cans** must be rinsed clean of food, have the labels removed, and be crushed flat. You'll find them easier to crush if you remove both ends.

**Glass bottles** can be any colour. They must be rinsed. Any plastic or metal tabs must be removed. Paper labels can stay on. The glass should be whole, not broken (for the safety of our volunteers).

The **plastic bags** we'll collect are the kind you carry your groceries home in. They should be empty and not too dirty.

Place everything in the blue bin. (Don't forget to write your address on the side of the bin). Volunteers picking up the materials will drive to your place, remove the materials from your bin and separate them into larger bins in their vehicle. The volunteers will then drive the materials to the depot (at Yellowknife Direct Charge Co-op), weigh them, and place them in the depot storage bins.

# Here's how to get stuff ready:

Preparation is extremely important. Ecology North is selling the recyclable materials to a buyer in Edmonton, in order to pay for shipping costs. If materials are not prepared properly, the buyer will not accept them. So please do the following:

## Tin cans

Rinse them clean of food, remove the paper labels, and crush them as flat as you can get them. (You'll find them easier to crush if you remove the ends).

## Aluminium cans

Crush them as flat as you can get them. Aluminium cans should be fairly clean.

## Glass bottles

can be any colour. Rinse them, and remove any plastic, metal or foil. Paper labels can stay on. The glass should be whole, not broken (for the safety of volunteers).

## Plastic bags

We're only collecting one type of bag for now: the kind you carry your groceries home in. They should be empty and not too dirty.

**That's it. No other materials for the time being until we see how things are going with these items.**

.....

## OTHER THINGS YOU CAN DO

There are other ways you can reduce waste too. Begin a garden compost heap for kitchen and garden refuse. Try to purchase products which use less packaging. Reuse as much as you can. Store any toxic materials such as left-over paint thinner or old batteries for the City's annual Toxic Waste Pick-up in August.

When we've accumulated enough materials, volunteers will load the materials onto a truck. The materials will be shipped to our buyer in Edmonton.

**********

Some waste materials are more valuable than others. We'll be subsidizing the shipping costs of the less valuable materials (like glass) with the sale of more valuable materials (like aluminium).

The Recycling Project will evolve as we gain experience.

Soon we hope to expand the program to include more kinds of plastic. If we're able to obtain indoor storage, such as a shed, we'll also collect paper products, such as cardboard and computer paper.

**********

## OTHER THINGS YOU CAN DO

There are other ways you can reduce waste too. Begin a garden compost heap for kitchen and garden refuse. Try to purchase products which use less packaging. Reuse as much as you can. Store any toxic materials such as left-over paint thinner or old batteries for the City's annual Toxic Waste Pick-up.

## RECYCLING IS WORTHWHILE

**********

On average, each person in Canada produces 150 pounds of garbage a month. That includes about 17 pounds of glass, 7 pounds of steel (tin) cans, and about 50 aluminium cans per person, per month.

Packaging is a big offender. Packaging makes up 50 per cent of the volume of our waste.

We can benefit the environment and ourselves by reducing the amount of waste that has to be landfilled. Recycling extends the life of the dump and reduces the amount of fill necessary to cover the garbage (fill is expensive in Yellowknife).

Industries which use recycled materials save energy and resources. For instance, the production of aluminium from cans instead of bauxite, cuts the amount of energy and water needed by more than half.

**********

## VOLUNTEERS

Your help does make a difference. If you have a free Saturday afternoon, let us know. We can use help with all aspects of collecting, storing and preparing waste materials. Call John at Ecology North, 873-6019.

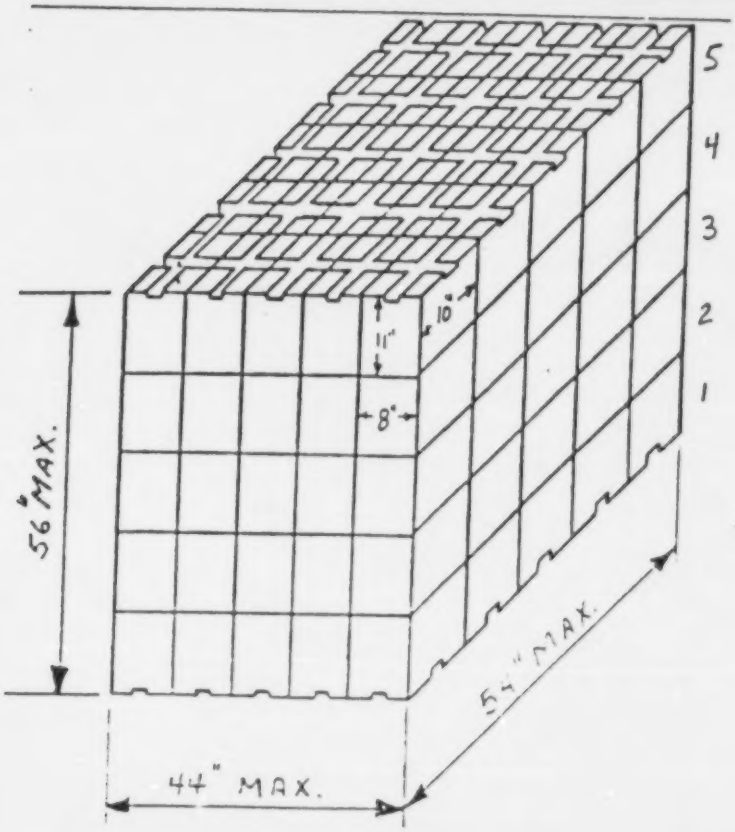
# APPENDIX D

## INFORMATION ON CAN DENSIFYING MACHINE

# DENSIFIER
## Model 300/500
## Biscuit/Bundle Stacking

**Biscuit Size**
**8" x 10" x 11"**

DENS-A-CAN INTERNATIONAL




## STACKING AND BANDING:

- Stack 5 across x 5 deep x 5 high (Total biscuits in bundle: 125)
- Place biscuits in bottom layer with grooves facing down.
- Stack biscuits in top layer with grooves facing up.
- IMPORTANT: BISCUITS MAY VARY SLIGHTLY IN LENGTH, AVERAGE LENGTH BEING 11". TOP LAYER MUST BE LEVEL TO MEET MATERIAL SPECIFICATIONS. TAKE CARE TO ENSURE TOP LAYER IS LEVEL. NON-LEVEL TOP LAYER MAY CAUSE REJECTION.
- Use ~~5/8~~" x .020 steel banding
- Stack one complete layer at a time.
- Place two horizontal straps on bundle, one around layer 2 and one around layer 4 as they are completed.
- Place one strap around EACH vertical column.
- Total straps: 12 (10 vertical and 2 horizontal)

## BUNDLE SPECIFICATIONS:

- IMPORTANT: MAXIMUM DIMENSIONS MUST BE MAINTAINED OR LOADING ONTO TRUCK OR RAILCAR MAY BE DIFFICULT.
  (See drawing for maximum dimensions)
- MINIMUM BUNDLE WEIGHT: 2285 lbs.
  (Biscuit weight will vary from 18 lbs. to 20 lbs. Bundle weight will vary from 2285 lbs. to 2500 lbs.)

For more information or to arrange a demonstration please call or write to:
DENS-A-CAN INTERNATIONAL

## . . . IMPROVED . . . DENS-A-CAN DENSIFIERS

The powerful densifier produces Premium Priced biscuits. They produce higher density than baling. No need for a flattener. No need to spot a trailer. No need to send cans to a processor for baling or shredding. No need to ship cans full of air. The densifiers are self contained, fully automatic and need little maintenance, space or capital investment.

The original densifier was pioneered in 1981 by Dens-A-Can International. Their purpose: make a low cost, efficient compactor to encourage community collection and efficiently ship aluminum cans to national recycling centers. The result: the DAC 1000 densifier that compacts up to 1700 lbs. per hour. It was a success!

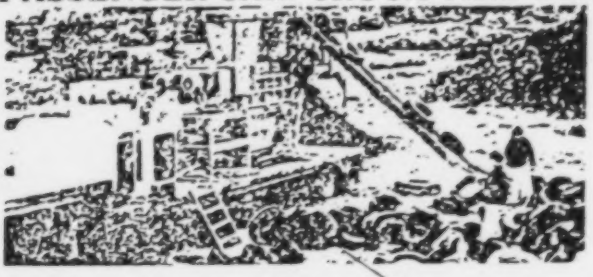
With three years field experience, Dens-A-Can created a "first" in simplicitic design and workings of the densifier. The DAC 300 and 500 broadened the range of capacity. And more important, they gave the industry a truely reliable machine requiring minimal, and when needed, ease of maintenance. They became the "standard of the industry."

Now, Dens-A-Can introduces NEW innovations. Five years of improvements brings you extended reliability and greater simplicity of maintenance. The improvements are too numerous to list here, but the details are yours for the asking.

DENSIFIERS with CONVEYOR from $12,500

Tell us your needs. We'll give you an appropriate recommendation. Just return the accompanying postcard. If your need is immediate, phone or FAX us now.

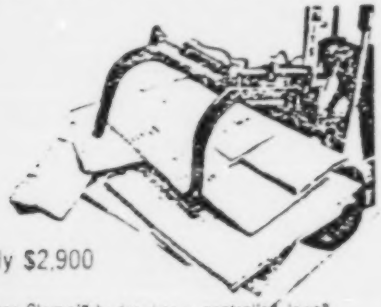
## PASSENGER CAR/ TRUCK TIRE DISPOSAL



MOBILE TIRE SHREDDER

The REMGRO Tire Slitter slits car and small truck tires in three pieces to eliminate "floating", reduce landfill. Priced under $3,000

## LOOSE MATERIAL HANDLING FORKLIFT ATTACHMENTS



only $2,900

Gator Clamp™ hydraulically controlled Jaws® secure unbalanced loads against the forks. Works well with bucket scoop.

$2,200

Low sides bucket scoop configuration handles over 1½ cubic yards of loose paper, corrugated and similar materials.

$2,200

REMGRO high sided scoop cradles and dumps small material such as bales, containers.

Profit from three NEW loose material gathering attachments that extend the utility of your standard forklift.

First, Gator Clamp™ Jaws® that gather and secure disheveled loads of loose material to save you as much as 80% time and labor. Especially useful in handling of paper and boxboard.

Second, Remgro Bucket Scoop that cradles over 1½ yards material. Hydraulically actuated, the operator maintains constant bucket motion throughout its range of 20 degree upward lift and 45 downward tilt. No "Shake, Rattle and Roll" to empty the scoop.

Third, combination Gator Clamp Jaws with Remgro Bucket S...

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# FORWARD

DENS-A-CAN'S DENSIFIERS have been in operation in the recycling industry since 1981, beginning with the DENS-A-CAN DAC 1000.

The DAC 300 and 500 Densifiers contain the latest technology in densification. They produce "easy to handle" premium priced biscuits - right at the collection point - to specifications approved by leading aluminum producers.

The DAC 300 and 500 have been designed for use at the smaller collection points. They compress up to an average of 300-500 per hour of empty aluminum cans to a density twice that of normal baling.

These Densifiers eliminate the need for a flattener - and no need to even spot a trailer. There is no need to send cans to a processor for baling or shredding - no need to pay for shipping air.

They are totally self-contained, fully automatic, and require minimal maintenance, space, or capital investment.

The Models 300 and 500 will run continuously as long as cans are being fed. They feature automatic shut off when the hopper empties ties. All DENS-A-CAN Densifiers feature high quality, reliable hydraulic components, advanced manifold type construction, and straight thread O-ring fittings that minimize hydraulic leakage.

The Models 300 and 500 Densifiers produced "biscuits" have a density of approximately 40 lbs per cubic foot. Each "biscuit" has a nominal weight of about 19 lbs and dimensions of 8" x 10" x 11. The "biscuits" are formed with grooves to facilitate banding together into larger "bundles."

The "biscuits" can be readily stacked and assembled into "bundles" containing 125 "biscuits" each measuring 51" x 41" x 56" high and weighing approximately 2250 lbs. No skids or pallets are required for forklift loading or stacking.

A 30 foot trailer will accommodate fourteen (14) "bundles" (31,500 lbs), a 40 foot trailer, eighteen (18) "bundles" (40,500lbs), and a 50 foot rail car will handle fifty-two (52) "bundles" (126,000 lbs).

The DAC 300 Densifier is approximately nine (9) feet long, three feet, nine inches (3'9") wide and five (5) feet high and weighs around 1500 lbs. The Model 300-S Densifier is eleven (11) feet long, also three feet, nine inches (3'9") wide, but is seven

feet, eight inches (7'8") high and weighs close to 2200 lbs. The DAC 500 is the same as the DAC 300 except it weighs 300 lbs more.

Shipment is made FOB, Greensburg, PA, completely assembled - ready for operation when connected to power and after hydraulic fluid is added at the receiving location. The Densifiers feature hydraulic densification and are mounted on two (2) fixed wheels and one (1) swivel wheel for easy placement and relocation.

The Model 300/500 and Model 300S/500S are identical, however, the the Model 300S/500S include an integral feed conveyor, magnetic separator and intake hopper at very little optional cost.

LIST OF FIGURES


| FIGURE | DESCRIPTION |
|---|---|
| 1 | CONTROL PANEL "LOCK-OUT POSITION" |
| 2 | FEED HOPPER ACCESS DOOR (IN PLACE) |
| 3 | AGITATOR BAR AND COUPLING |
| 4 | DOOR CYLINDER & BISCUIT EJECT GUARD |
| 5 | SAFTEY GUARD AND POWER SUPPLY CONNECTIONS |
| 6 | CONTROL PANEL SWITCHES |
| 7 | HYDRAULIC PRESSURE GUAGE |
| 8 | CONVEYOR BELT ADJUSTMENT |